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DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

CONTENTS:

ROLE OF PENICILLIN AND FEVER THERAPY IN NEUROSYPHILIS 331
A. E. Bennett, M.D., and E. A. Hargrove, M.D.
Omaha, Nebraska

THE INITIAL PSYCHIATRIC INTERVIEW IN A GENERAL HOSPITAL 337
Harriot Hunter, M.D., Denver, Colorado

PROGRESSIVE MUSCULAR DYSTROPHY 342
Louis J. Karnosh, M.D., and Salvatore R. LaTona, M.D.
Cleveland, Ohio

PSYCHOSOMATIC CONFERENCE 345

EASTERN ASSOCIATION OF ELECTRO-ENCEPHALOGRAPHERS 351

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DISEASES of the NERVOUS SYSTEM

(PUBLISHED MONTHLY)

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

Role of Penicillin and Fever Therapy in Neurosyphilis *

A. E. BENNETT, M.D. and
E. A. HARGROVE, M.D.
Omaha, Nebraska

Until the advent of penicillin the therapy of neurosyphilis included various arsenicals and heavy metals combined with artificial physical fever or malarial inoculation. The demonstration that penicillin is effective against the treponema pallidum *in vivo* and is successful in treatment of early syphilis led to its trial in the later stages of the disease.

In 1945 we began to treat neurosyphilis with penicillin and artificial physical fever. The purpose of this paper is to compare the results of this series with an earlier series[1] from our department treated with artificial fever, mapharsen and bismuth.

CASE MATERIAL

Sixteen patients with neurosyphilis were treated with penicillin and artificial fever therapy. Commercial penicillin in aqueous solution was injected intramuscularly every three hours day and night. The total dosage ranged from 4,000,000 to 8,000,000 units. Intrathecal penicillin was not used. With one exception patients received 36 to 50 hours of artificial fever above 105°F. Twelve had paresis or taboparesis; one asymptomatic neurosyphilis and three meningovascular neurosyphilis. Age varied from 30 to 54 years. Thirteen were graded as mild or intermediate types and three as severe; 11 had received previous antiluetic therapy.

a) Effect of Treatment: Clinically two patients obtained full remissions and 11 improved; three became worse and were transferred to state hospitals for further treatment where one died. Herxheimer reactions were noted in seven patients; two had febrile reactions with rise of temperature to 101°F; five others had accentuated psychotic reactions.

Following is the case report of a failure: A 45 year old man was admitted to the hospital on March 21, 1946. Three years previously a positive blood serology was found on army examination. For two years before admission treatment consisted of alternate doses of arsenic and bismuth without improvement in the blood reaction and with progressive failure of visual acuity in the right eye. Prior to admission he had begun to lose weight and on entrance had lost 40 pounds; he had lancinating pains in both legs; his family had noted personality changes.

Upon admission the patient displayed evidence of organic psychosis, as well as a fine tremor about the mouth and hands; optic atrophy; hyperactive deep reflexes, but diminution of ankle jerks; and a pronounced weight loss. Blood serology was positive and spinal fluid examination was strongly positive, with a paretic formula. Combined artificial fever-penicillin was begun. After a week in the hospital his condition became

*From the A. E. Bennett Neuropsychiatric Research Foundation, Omaha, Nebraska.

worse; he was transferred to the psychiatric department where he continued to display an acute delirious reaction. He received a total of 4,100,000 units of penicillin and 8 artificial fever treatments. Because of failure to improve and economic factors he was transferred to a state hospital after 46 days of hospitalization. The patient received one fever treatment at the state hospital and shortly thereafter died.

b) The Effect of Penicillin on the Abnormalities of the Spinal Fluid: Following fever-penicillin treatment the high cell count in the spinal fluid disappeared and there occurred prompt drop in total protein content in all cases. Eventually a reduction of intensity in the colloidal gold curve occurred in 7 cases. At the end of therapy there was complete reversal in the spinal complement fixation in only two cases. Seven subjects showed a falling titer and seven no changes.

c) Retreatments: One patient, a paretic, in this group was retreated. Following the initial therapy with artificial fever-penicillin this patient obtained a complete clinical remisson as well as a return to normal in spinal fluid findings, but relapsed partially seven months later.

Following is his case report: Male, aged 30, was rejected by the army for positive blood and spinal fluid findings 2½ years before admission. He then received several series of arsenic and bismuth with short intervening rest periods. The patient reported a primary lesion at the age of 15, not treated at that time; he was never aware of secondary manifestations.

Two weeks before his admission to the hospital on June 21, 1945 he began to show emotional elation, with dysarthria and memory failure. Neurologic examination showed Argyll-Robertson pupils, tremor of the eyelids, tongue and hands, and bilateral increase of deep reflexes. Blood serology was positive and spinal fluid reactions were likewise strongly positive. Treatment consisted of 4,000,000 units of penicillin in doses of 25,000 units every three hours, plus artificial fever for a total of 36 hours in 12 sessions. Following treatment serologic examination showed a positive blood serology, but the spinal fluid cell count and total protein were within normal limits and the Eagle and colloidal gold tests were negative. There was a complete clinical remission; the dysarthria, sensorium changes and delusions of grandeur were entirely gone.

Seven months later the patient, according to the family, began to show poor judgment and expansive behavior. Repeated blood and spinal fluid tests were strongly positive. The patient was given ten more sessions of fever with mapharsen and bismuth without penicillin for a total of 30 hours. At the end of this time tests showed blood serology positive, spinal fluid showed flocculation test negative, complement fixation test negative and colloidal gold curve 0122100000. Neurologic examination showed persistence of Argyll-Robertson pupils and questionable personality changes in the form of loss of self criticism and poor judgment. Follow-up on May 10, 1947 showed spinal fluid positive in all dilutions, cells 22, protein 21 mg. percent; neurologic examination normal except for persistent Argyll-Robertson pupils; mental status excellent.

The 16 cases, treated by artificial fever-penicillin method, showed the following data:

SEVERITY—(12 male, 4 female)
13 graded as mild or intermediate types
3 graded as severe types

CLINICAL RESULTS—

	Full Remission	Improved	Unimproved
Immediate	2	11	3

SEROLOGIC RESULTS—
Blood:
Immediate—16 remained positive*
0 reversed negative

Spinal Fluid:
Immediate—7 less positive
7 unchanged

*Blood serology no longer reported in titers as noted in statistics below.

These results may be compared with those obtained in a previous report[1] of 50 cases of general paresis treated by artificial fever combined with arsenic and bismuth injections.

SEVERITY—(40 male, 10 female)
41 graded as mild or intermediate types
9 graded as severe types

CLINICAL RESULTS—

	Full Remission	Improved	Unimproved	Deaths
Immediate	20	26	4	1
Follow-up (3 yrs.)	28	17	3	2

SEROLOGIC RESULTS—

Blood:

	Less Positive	Reversed Negative
Immediate	11 of 46	8 of 46
Follow-up (1-5 yrs.)	14 of 29	10 of 29
Spinal Fluid:		
Immediate	28 of 41	7 of 41
Follow-up (1-5 yrs.)	26 of 30	19 of 30

The results of the penicillin-fever treated cases do not equal those treated with fever, bismuth and mapharsen. Comparison is difficult, however, because of the present small number of cases.

DISCUSSION:

The proper management of neurosyphilis has always been a difficult and challenging problem. No single agent has ever been entirely successful in the management of neurosyphilis, but early diagnosis, treatment and cooperation of the patient would eliminate late cases of active clinical neurosyphilis. One-third of cases of acute systemic lues during the first year have positive spinal fluid findings. In ten percent of this group active clinical neurosyphilis later develops because of omission of routine spinal fluid studies or ineffective treatment.

Active clinical neurosyphilis is subtended by vascular and parenchymal changes, isolated foci of spirochetes and gummatous areas. Such foci are relatively inaccessible to antibiotic agents like penicillin and in themselves argue against the successful use of penicillin alone. Another adverse factor is the lack of diffusibility of penicillin into the cerebrospinal fluid. Many investigators[2,3,4] have demonstrated insignificant amounts of penicillin in the cerebrospinal fluid following intravenous administration. However, Schwemlein, *et al.*,[5] showed that massive doses of penicillin increased concentration in the cerebrospinal fluid directly proportional to the penicillin dosage.

The effect of penicillin therapy is demonstrated in several ways. Spinal fluid improvement may include reduction in cell count, total protein, intensity of colloidal test and complement fixation test, and return to normal. In 122 cases of neurosyphilis reported by Stokes,[6] the spinal fluid tests improved to some degree in 74 percent. A drop in cell count and in total protein content were the most common changes reported. Improvement was seen also in 25 percent of cases of asymptomatic neurosyphilis and in 10 percent of cases of paresis and taboparesis. In an earlier series[7] we reported serologic reversal in 73 percent of asymptomatic cases treated with artificial fever, mapharsen and bismuth.

Symptomatic responses also offer an index of effectiveness, though less graphic than spinal fluid changes because of difficulty in interpreting the patient's subjective complaints and the irreversibility of objective neurologic findings. The Herxheimer-like reactions noted on the second day in 20 percent of cases comprise exacerbation of paretic symptoms, hallucinations, mania, convulsions, transient myelitic syndromes and exacerbation of lancinating pains.[6] Serious complications have been reported and at least 10 deaths have occurred following penicillin therapy.[8,9] The patients' poor physical condition is at fault in some cases, but the higher incidence of serious reactions warrants hospital observation.

Systemic administration of penicillin has been the method of choice. The dosage has varied from 25,000 to 50,000 units administered every 2, 3 or 4 hours for 8 days, for a total of 1,200,000 to 4,000,000 units. It has been suggested[6] that in late syphilis (especially neurosyphilis) repeated small but nevertheless adequate doses will effect improvement, perhaps by stimulating or utilizing the patient's resistance and defensive response. Penicillin given alone requires at least 4,000,000 units in each course, which may be repeated at 3-6 months intervals, depending on the activity of the cerebrospinal fluid and the clinical status of the patient.[10]

Many investigators, hoping to improve therapy of neurosyphilis by penicillin alone

have found results disappointing. However, its effectiveness must be studied with each clinico-pathologic type since the type is an important factor in prognosis.

Asymptomatic Neurosyphilis: Following penicillin therapy of asymptomatic neurosyphilis, a majority of patients achieved a normal cell count and protein value in the cerebrospinal fluid; the gold curve and complement fixation reactions remained positive. Although patients of this type have no subjective complaints and the objective neurologic examination is normal, many spoke of an increased feeling of well being after penicillin therapy, and demonstrated a 10-20 pound weight gain. Stokes, *et al.*,[11] in a series of 40 cases treated only with penicillin, found the spinal fluid in 18 markedly improved, and in 22 improved somewhat. Penicillin *combined* with fever therapy produced a more rapid response in the reactions of the spinal fluid than did penicillin alone.[10] It has been demonstrated previously that serologic reversal occurred in 73 percent of asymptomatic cases treated with fever and mapharsen and bismuth.[7]

Dementia Paralytica: Favorable results from penicillin therapy have been reported in the treatment of paresis. Clinical improvement was manifested by a clearing of confusion, decrease in psychomotor activity and mood swings, improvement in tremors and speech as well as weight gain. Yet other workers have not found such promising results. The question arises then whether true paretic dementia existed in the cases which responded so well, and if so, what type and severity. In paretic patients, more clinical remission followed combined penicillin-fever treatment than followed penicillin alone. O'Leary[10] saw no frank clinical remission in a paretic patient after the administration of penicillin. Reynolds, Mohr and Moore[12] described encouraging results with penicillin in the treatment of dementia paralytica, but superior results with combined penicillin and fever treatment. Heyman[13] reported likewise. However, penicillin alone may be justified in treating patients whose age and general physical condition increase the hazard of fever therapy.

In dementia paralytica penicillin therapy did not alter appreciably the signs of neurologic damage; spinal changes were less decided in this more severe type of the disease. As a rule the spinal fluid cell count and total protein promptly became normal, and the colloidal gold and Wassermann tests gradually improved.[12] The favorable results persisted at least four months. Electroencephalography in 9 of Gammon's cases of paresis showed 6 abnormal records. After penicillin treatment the alterations were absent in 3 and reduced in 2 of the records.[14] Three of our cases which were treated with artificial fever-mapharsen and bismuth obtained clinical remissions as well as return to near normal electroencephalographic tracings.[1]

Tabes Dorsalis: The results of penicillin therapy for tabes dorsalis are less favorable than for paresis. Tabes has notoriously resisted all types of therapy, but early tabetic symptoms have responded to combined fever-mapharsen and bismuth.[7] Penicillin given alone reduced the frequency and intensity of the lightning pains in the majority. O'Leary stated that manifestations such as gastric crisis, ataxia and incontinence abated little.[10] Stokes states that 6 of 9 patients suffering from lightning pains (one case of 12 years' duration) were improved. In the majority of cases the tendon reflexes and posterior column changes remained unaltered after therapy. Changes in the spinal fluid following penicillin, of lesser degree than those seen in paresis, have been reported.[15]

Acute Luetic Meningitis: Nelson and Duncan[16] described results of penicillin in 10 cases of acute luetic meningitis. These cases were characterized by clinical findings of meningitis, i.e., headaches, cranial nerve palsies, papilledema, and impaired consciousness and at times stupor. With penicillin therapy the headache and neck rigidity disappeared in 24 to 48 hours. The cranial nerve palsies rapidly regressed. The pleocytosis of the spinal fluid decreased and remained normal except for one case, in which pleocytosis recurred; another course of therapy was given. All were clinically well when seen 3-10 months later. Results of penicillin therapy in this type are the

most encouraging of all reports in active neurosyphilis.

Meningovascular Syphilis: Reports have been scarce. Stokes, *et al.*,[6] in 10 cases noted marked clinical improvement in 4, slight improvement in 2, no change in 3 and progression in 1. Gammon, *et al.*,[15] reported that the spinal fluid showed marked improvement in 4, slight in 13, no change in 4, and progression in 1 case.

Ocular Syphilis: O'Leary[10] found that the combined use of penicillin and fever therapy offered more encouragement in arresting progressive loss of vision than did any treatment previously used. Stokes and Rose were similarly enthusiastic about arresting optic atrophy by this means.

Congenital Neurosyphilis: Six patients[17] with late congenital asymptomatic neurosyphilis, in most of whom adequate arsenic and bismuth therapy had not effected serologic changes, received a total dosage of 40,000 units of penicillin per kilogram of body weight for 7½ days. The cell count and protein level were reduced immediately after treatment in almost every case; 4 obtained a significant spinal fluid response; the colloidal gold curve, protein level and cell count were normal one year after treatment. Wassermann test in each remained positive, but reduction of titer was noted. One had slight elevation of cell count, another continued elevated protein level. Two juvenile paretics were treated with penicillin alone. No clinical change, but some cerebrospinal fluid improvement was noted. In 2 children with progressive 8th nerve deafness, penicillin improved hearing somewhat in the mild case with no change in the severe case.

Critique: The studies of penicillin therapy in neurosyphilis reveal certain points. Although its use is beyond the experimental stage, its value remains controversial and its final status still to be determined. Most investigators believe this antibiotic has active therapeutic value in all forms of neurosyphilis, but the majority evaluate penicillin as an adjunct to other well established therapies. Reese[18] concluded: "In neurosyphilis penicillin is not fulfilling its expectation. Malaria or fever treatment in combination with mapharsen, tryparsamide and bismuth is superior and cures the meningeal and parenchymatous types. We have not been able to alter the Wassermann serology of central nervous system syphilis with large, continuous and repeated medication of penicillin although a certain amount of physical well-being has been obtained in some patients."

Others[10, 12, 19] reported greater serologic and clinical improvement with combined penicillin and fever therapy than with either alone.

Unfortunately, malarial therapy is still occasionally termed the fever therapy of choice. Almost without exception advocates of malaria have had no experience with hypertherm therapy. They disregard the conclusions of the Cooperative Clinic Group Study made by the U. S. Public Health Service[20] and comparative analyses by Ebaugh,[21] who, after long experience with malaria, found artificial fever preferable. Enthusiasts of malaria contend there is something specific in malaria. However, excellent results have also been observed by many in treating paralytica dementia by a variety of fever inducing methods such as typhoid vaccine, sulfur in oil, rat-bite fever and relapsing fever.[22] Fever induction by whatever method achieves good results in neurosyphilis, provided that height and duration of fever are sufficient.

CONCLUSIONS:

Our experience to date indicates that penicillin is an adjuvant in the management of neurosyphilis, but has definite limitations and hazards. It is not an effective single agent for the complete cure of neurosyphilis. Best results are obtained in asymptomatic states or acute syphilitic meningitis. Even in these types it is not a specific; our previous methods have been at least equal to reported results. In active clinical neurosyphilis, paretic dementia and tabes dorsalis, penicillin should not be relied upon alone.

When combined with fever, the results at least equal those with previous combined mapharsen-bismuth and fever. The final complete spinal fluid reversals from penicillin and fever so far seem no better than

those attainable with previous methods. A combination of fever and mapharsen-bismuth or penicillin is still required to prevent progression and to produce a clinical remission in active clinical neurosyphilis. Penicillin has not replaced fever therapy as the most important single agent in the relief of neurosyphilis, as some have predicted.

Some of these observations may change as effective fractions or derivatives of penicillin more therapeutically effective are finally demonstrated.

REFERENCES

1. Bennett, A. E., Cash, P. T., Hoekstra, C. S.: Artificial Fever Therapy in General Paresis with Electroencephalographic Studies. *Psychiatric Quart.* 15: 750-71 (Oct.) 1941.
2. Abraham, E. P., Chain, E., Fletcher, C. M., Gardener, A. D., Heatley, N. G., Jennings, M. A., and Florey, H. W.: Further Observations on Penicillin. *Lancet* 2: 177-188, 189 (Aug. 16) 1941.
3. Rammelkamp, C. H., and Keefer, C. S.: Absorption, Excretion and Distribution of Penicillin. *J. Clin. Investigation* 22: 425-437 (May) 1943.
4. Herrell, W. E., Nichols, D. R., and Heilman, Dorothy H.: Penicillin; Its Usefulness, Limitations, Diffusion and Detection, with Analysis of 150 Cases in Which It Was Employed. *J.A.M.A.* 125: 1003-1010 (Aug. 12) 1944.
5. Schwemlein, G. X., Barton, R. L., Bauer, T. J., Loewe, L., Bundesen, N. N., and Craig, R. M.: Penicillin in Spinal Fluid After Intravenous Administration. *J.A.M.A.* 130: 340 (Feb. 9) 1946.
6. Stokes, J. H., Sternberg, T. H., Schwartz, W. H., Mahoney, J. F., Moore, J. E., and Wood, W. J., Jr.: Action of Penicillin in Late Syphilis, Including Neurosyphilis, Benign Late Syphilis and Late Congenital Syphilis. Preliminary Report. *J.A.M.A.* 126: 73-80, 1944.
7. Bennett, A. E.: The Present Status of Fever Therapy in Neurosyphilis. *Neb. St. Med. J.* 27: 3-7 (Sept.) 1942.
8. Walker, A. E., Johnson, H. C.: Treatment of Syphilis of Nervous System—"Penicillin in Neurology." *Chas. C. Thomas*, Publisher 157-163 (May) 1946.
9. Neyman, Clarence A., Heilbrunn, Gert, Youmans, G. P.: Experiments in the Treatment of Dementia Paralytica with Penicillin. *J.A.M.A.* 128: 433 (June 9) 1945.
10. O'Leary, Paul A., Kierland, Robt. R.: Today's Treatment of Syphilis. *J.A.M.A.* 132: 430-434 (Oct. 26) 1946.
11. Stokes, J. H. and Steiger, H. P.: Penicillin Alone in Neurosyphilis. *J.A.M.A.* 131: 1-7 (May 4) 1946
12. Reynolds, Frank W., Mohr, Charles F., Moore, J. E.: Penicillin in the Treatment of Neurosyphilis. Dementia Paralytica; *J.A.M.A.* 131: 1255-1260 (Aug. 17) 1946.
13. Heyman, Albert: The Treatment of Syphilis of the Central Nervous System with Penicillin. *Am. J. of Med. Sciences.* 213: 661-670 (June) 1947.
14. Gammon, G. D., Stokes, J. H., Lentz, J. W., Steele, W. H., Rose, E. K., Scott, J., Scott, D. M., Jr., and Ornsteen, A. M.: Immediate and Early Effects of Penicillin on Syphilis of the Central Nervous System. *Pr. Am. Neurol. A.* 70: 65-69, 1944.
15. Gammon, G. D., Stokes, J. H., Beerman, H., Ingraham, N. R., Jr., Lentz, J. W., Morgan, H. G., Steele, W., Rose, E. K., with the technical assistance of Mayer, V.: Penicillin in Neurosyphilis: Effect on Blood and Spinal Fluid. *J.A.M.A.* 128: 653-654, 1945.
16. Nelson, R. A., Duncan, L.: Acute Syphilitic Meningitis Treated with Penicillin. *Bull. Johns Hopkins Hosp.* 75: 327, 1944.
17. Yampolsky, J., Heyman, A.: Penicillin in Syphilis in Children. *J.A.M.A.* 132: 368-371 (Oct. 19) 1946.
18. Reese, Hans H.: Review and Progress in Neurologic Problems. *Dig. of Neurol. and Psychiat.* 15: 188-199 (April) 1947.
19. Rose, Augustus S., Solomon, Harry C.: Penicillin in the Treatment of Neurosyphilis. *J.A.M.A.* 133: 5-10 (Jan. 4) 1947.
20. O'Leary, P. A., Bruetsch, W. L., Ebaugh, F. G., Simpson, W. M., Solomon, H. C., Warren, S. L., Vonderlehr, R. A., Usilton, Lida J., and Sollins, I. V.: Malaria and Artificial Fever in the Treatment of Paresis. *J.A.M.A.* 115: 677-681 (Aug. 31) 1940.
21. Ewalt, Jack R., Ebaugh, Franklin G.: Treatment of Dementia Paralytica. A Five Year Comparative Study of Artificial Fever Therapy and Therapeutic Malaria in Two Hundred Thirty-two Cases. *J.A.M.A.* 116: 2474 (May 31) 1941.
22. Bennett, A. E.: Artificial Fever Therapy. *Practitioners' Library Supplement*, Chapt. LXVIII, 657-680, 1937.

The Initial Psychiatric Interview in a General Hospital

HARRIOT HUNTER, M.D.*
Denver, Colorado

Psychiatric liaison work in a general hospital has many special problems, not the least of which is presented by the initial interview with the patient. This is true in the out-patient clinic, but even more so in consultation work on the medical and surgical wards. When a patient directly seeks psychiatric help from a private physician or a psychiatric clinic, he is voluntarily requesting treatment. When he is seen by a psychiatrist in the course of an out-patient routine or on a ward of a general hospital, it is usually without his knowledge or consent. This gives rise to many special problems which have to be handled by the psychiatrist not only in evaluating the patient for consultation purposes, but also in considering future treatment.

The general hospital patient, no matter what his difficulty, has certain emotional needs and problems which are part of being a patient. These needs must be met in treatment, whether it be a medical or surgical case. When a patient enters the hospital, and the simplest of these needs—those arising from being sick and separated from his family—are not met, there emerge inner tensions and emotional problems which can become difficult for the average medical and nursing staff to handle. It may add considerably to the ordinary routine care for that particular patient. These patients, in general, are not "mental cases" and transfer to the psychopathic ward is seldom considered. Thus it becomes the province of the psychiatrist in consultation to contribute to the treatment of the patient on the particular ward.

Similarly, with medical or surgical out-patients, problems arise in the initial interview by virtue of the fact that these clinic patients are free patients, they are told where and when to go, and are usually teaching cases, seen by a medical student or in the presence of a student. The very fact that they have been referred to so many different doctors with no notion of why is enough to cause certain anxieties and tension within them. Sometimes they suspect, that they have been referred to a psychiatrist; this produces slimly concealed resentments which have to be understood, met and dealt with. That they have kept many appointments, had many examinations and seen many doctors without knowing any results, and have had to spend the major portion of their time (often missing work or school) waiting on the benches is particularly rankling. The hostility and aggression these people sometimes build up toward the clinic and the doctors often may be overwhelming and must be dealt with in the psychiatric interview, since it is unfortunately true that this is the only place where any attempt is made to solve the situation. The simplest thing the physician can do, and which is most often left undone, is to explain to the patient the results of his examinations and what comes next and why.

Whether the patient is a ward patient or an out-patient the previous management of his case often contributes to his anxieties and feelings of hostility. Psychiatric evaluation of these cases helps considerably in formulating a comprehensive treatment plan, and therapeutic goals, whether medical, surgical or psychiatric. A patient who is anxious or apprehensive about an operation because of personal or family problems may be a poor surgical risk. The psychiatric interview in such cases, and usually there is no time for more than one, may be a valuable adjunct in making the operation and postoperative course successful. These patients may be on the verge of giving up hope of receiving help from the hospital or of learning results of examinations and treatment when they come to the psychiatrist. It becomes his job to restore the reputation of the hospital or clinic in the patient's eyes,

*From the Psychiatric Liaison Department, Colorado General Hospital, Denver, Colorado.

and to offer the opportunity for further treatment which provides in many psychosomatic cases the only possible answer to their problem.

If these patients are aware that they are in the presence of a psychiatrist, they may be belligerent, resentful that anyone should consider a mental examination necessary and inclined to believe that they are thought of as "nuts" or belonging in the "bug-house." Their main complaint under these circumstances is that nothing physical has been found and yet their symptoms are just as distressing as ever, and something physical *must* be wrong. They feel cheated if the examination proves to be negative. It is the psychiatrist's job during the initial interview to reassure these patients by explaining in simple psychiatric terms the emotional origin of some of their symptoms, using freely simple every-day examples of the physiology of the autonomic nervous system, such as blushing, fear, simple examination anxiety, etc.

In this particular work, the initial interview is of paramount importance. More and more in psychiatric teaching we are coming to think of psychotherapy as something tangible and definable, having well-defined limits, goals and objectives, and which can be passed on to another individual in teaching. It is no longer the vague, mystic process which formerly took place behind closed doors and was completely left out of the teaching curriculum for graduate and undergraduate students in psychiatry because of its instinctive, haphazard nature and entirely personalized quality. Formerly the masters were able only to instill into fledgeling psychiatrists a description of procedure in psychiatric interviewing consisting essentially of formal history taking.

In the first contact with the patient, a relationship between two human beings is set up. The process of attaining good rapport with the patient begins. The treatment situation is approached. The subsequent course of the therapeutic process may be significantly influenced by the first hour spent with the patient. In this interview it is important to be able to give the patient a sense of freedom rather than the constricted sensation resulting from a stereotyped question and answer procedure. It is also important to allow enough time for the patient to state the problem and for the therapist to take up any specific emotional difficulties which present themselves as a result of the circumstances outlined above.

It is often necessary at this time to decide on the methods of therapy and to determine its goal. Another important function of the therapist which should begin in the initial interview is to recognize and work with the resistances presented, even in patients who come voluntarily for treatment. It is the therapist's job to recognize feelings of resistance and to accept them, thus helping the patient to look upon them as natural, or at least understandable, and eventually to overcome them. Another very useful and simple measure is that of reassuring the patient that his problem is not unusual, his feelings not unique and that many other patients with similar problems have been helped. Some distinction should be made between the treatment and handling of patients who come with the purpose of obtaining psychiatric help and the management of those who are resistant from the beginning. In the former case, much of the spade-work has already been done.

Case Histories

The following case histories and examples of the initial interview in each case are presented to illustrate our discussion:

H.C., (medical) a 27 year old woman was interviewed on her second day of hospitalization for a condition at first thought to be polio. It later proved to be hysterical in nature. The patient was a bedraggled, lethargic individual with an expression of acute weariness and sadness in her face. There was also evidence of belligerence in her expression and later in her words. Her arm was thrown up over her eyes, and there was a grim determination not to enter into any conversation. The first sally on the therapist's part consisted in a few routine questions concerning the illness and her hospital admission and was met with a strong verbal counter-thrust by the patient, embellished with choice verbal tidbits.

The resistance was inescapable and indicated a severe negativism on the patient's part. A new tack was tried with success. The therapist made the positive suggestion that questions were ex-

tremely annoying when one felt as sick and miserable as she and then settled back in the chair to await the outcome. A long silence ensued broken twice by further suggestion in a sympathetic vein that sometimes it was hard to talk to strangers, especially after prolonged interrogations by members of the resident staff, that there were many things especially hard to talk about and that sometimes the burden of life and its worries become unbearable so that we feel like running away. This lucky shot had an almost miraculous effect. The patient removed her arm from her eyes and agreed quietly that this was true. The therapist then suggested that perhaps talking about some of these things with someone who was experienced in listening to the troubles of others might help. The patient then volunteered information, dramatic in its import. She said, "I killed my baby." In the next few minutes she sketchily outlined the present illness beginning with her last pregnancy which was interrupted by a Caesarean section and resulted in a still birth. She declared she blamed herself for the death of this baby because she had not wished to be pregnant and had failed to seek medical advice until too late in the pregnancy to save the baby. Evidently she had a toxemia of some sort. Following this, she buried her face in the pillow and cried. After a long silence the therapist suggested that such a burden was very difficult to carry and that it was natural to want to escape from it and that perhaps the reason the patient was hiding her face from the examiner was because she was afraid to face people. This produced an immediate effect; the patient agreed tearfully and looked at the examiner for the first time during the interview. Subsequent interviews took place weekly for six months and a marked improvement has resulted.

In this subject it is important to point out that the violent cursing at the outset did not have the desired or expected effect on the therapist. On the contrary, the patient was told that her reaction was not out of the ordinary. Additional insight on the therapist's part into the patient's emotional reactions gave her some positive feelings to work on and must have helped her to make the dramatic confession that then came out. If all the negative factors in the interview had been added up (the patient's negativism, the hysterical nature of the reaction, the poor economic and social conditions indicated, the low cultural and intellectual level which seemed apparent from the patient's speech, etc.) and the therapist's hostility provoked by the vituperative and ungrateful attack, this interview might easily have ended the contact, or at least sealed off the relationship in such a way that therapy would have proved impossible. As it was, the carefully worded statements gave the patient a promise of future understanding and freedom of expression on her part that has resulted in an extremely beneficial course to date.

F.R., 37 year old discharged WAC, was seen on medical ward. Diagnosis infectious jaundice, anemia. The initial interview had to do with the subsequently poor course of the therapeutic relationship which sputtered along spasmodically for several months with no improvement either medically or psychiatrically. The patient is a very intelligent woman who had responsible position overseas. During the initial interview, the procedure was formal and restricted, directed to obtaining factual material on highly personal subjects which the patient resented, arousing antagonisms which she was never able to dispel in subsequent contacts. During the questioning, to which she was superficially very cooperative, she was asked questions about her personal interests and activities, including her religious beliefs. This touched an extremely sensitive point, and she began to weep. She asked why it was necessary to bring up her personal life. The explanation did not satisfy her. The third degree nature of the interview was distressing and rather insulting to her intelligence and good nature. However, it was conducted during a stage in the examiner's career when personal insecurities seemed to demand a formalized procedure and where gaps in the conversation engendered as much embarrassment to the therapist as the patient. A much more friendly, casual type of contact for the first interview was indicated.

M.B., a 39 year old housewife seen on the surgical ward a few days following hysterectomy, had a history of two years of neurotic symptoms consisting in obsessive trends with specific phobias, but which she had controlled largely by her own determination and considerable ego strength. Following the operation many of these feelings recurred and she became a serious nursing problem. She began to vomit and the question of maintaining fluid balance became a problem in view of her extreme fear of needles and intravenous treatments. The Gyn surgeon had, on his own admission, been rather rough with his patient utilizing what he termed "mediaeval methods" to stop her vomiting, to no avail. At the time of the first psychiatric interview she was fearful, apprehensive and disturbed. She had vomited and her bed clothes were foul smelling and dirty. Her first statement was, "I need sympathy." During the next half-hour the patient related much of her past marital and personal history which was of a rather distressing emotional nature, with several traumatic experiences and many economic struggles. Recently after getting her feet firmly planted on the ground, a new pro-

fessional venture of her husband's had robbed her of her new found security and in view of his previous marital infidelity she thought, as she expressed it, "It wasn't worth the struggle before, and now I've got it all to do over again." She expressed remorsefully the wish that she had died on the operating table. She complained of the nursing care and of the treatment from the staff, who had been unsympathetic and disgusted with her behavior, more so since she had been more or less model patient before her operation. She was surprised at revealing so much personal material on the first contact, saying, "I don't know why I'm telling you all this; I've never told anyone before, not even my best girl friend. But then, nobody else up here would have thought that had any bearing on the case." Following this the patient's condition took a turn for the better. She stopped vomiting, later even submitted to intravenous fluids, and even though her course was complicated by a condition necessitating further surgery, her mental condition continued to improve with further very beneficial ventilation of long-standing, pent-up resentments.

T.W., a 51 year old man was seen for the first time in the out-patient department, referred from the medical clinic. His was a vague, inconsequential history of long standing complaints of a neurotic nature and the referring physician had written little on the consultation request. Unfortunately, it was assumed that the patient had been prepared for the referral and knew this was to be a psychiatric interview. The therapist began the session with a few routine questions concerning the present illness. The responses were not spontaneous or adequate and for the most part monosyllabic, but there was no indication of the smoldering resentment that was loitering beneath the surface and which, indeed, subsequently exploded with a tremendous blast. An attempt at personal history met with little success and the patient became a restless but the psychiatrist missed any hint of open antagonism. The extremely brief answers indicated that the man had led a bachelor-like existence since the death of his wife and baby in 1918 in the "flu" epidemic. His obvious reticence about the details of these events, plus his apparent pre-occupation with the faults of the attending physician should have sounded a warning but it went unheeded. In a brief but casual inquiry into the sensorium of the patient, a very innocuous question was asked about the events of the day and reference was made to a recent exciting game between the Cards and Dodgers. This was the signal for a violent outburst of emotion, antagonism and explosive hostility seldom witnessed outside of a psychopathic ward. The patient was perhaps justifiably incensed at the trivial nature of the doctor's questions, stating that if he wanted to talk about baseball, he would not come to the hospital. Furthermore, indulging in a vitriolic binge of name calling, he indicated that the examiner was not even a doctor and had no right to question him in any way at all. He was allowed to vent his spleen in spite of the rising anger with which the therapist met each new insulting slander and was finally requested quietly whether he wished to remain further and continue his onslaught or leave. He chose the latter course but not without a few backward thrusts as he went out, delivered in a loud, raucous, belligerent voice heard by the entire clinic. This individual undoubtedly should be labelled a paranoid psychopath but his case perhaps could have been handled more tactfully by both the referring and the examining physicians.

C.J., a 26 year old married woman was referred by the medical clinic because of multiple physical complaints and severe headaches without discoverable organic basis. She was noticeably antagonistic to the very first questions although worded carefully to reassure the patient that adequate attention was being paid to the physical nature of her complaints. Questions concerning her personal affairs were met with increasing hostility. Since the examiner was planning to refer the case to another doctor for treatment, further investigation into the nature of the illness and the patient's personality was curtailed and care was taken to handle the patient's obvious hostility and resentment at being considered a candidate for psychiatric therapy. She was urged to bring these feelings to the surface and express what she felt. Instead of this she reiterated her physical complaints with an emphasis on the physical nature of her symptoms and a challenge that this had not thoroughly been investigated. Attempts at reassurance met with little success but she seemed to be somewhat mollified by the explanation that psychiatric investigation and therapy were part of the whole picture and that her physical condition would not be neglected. She finally agreed, with obvious misgivings, to accept the opportunity for psychiatric therapy with the idea that it was an avenue of investigation that should not be neglected. The next day this patient was seen in the medical clinic, the physician noting that she was to return for further psychiatric therapy, informed her that she was perfectly well physically and that she did not need any further examination or appointments with him, but stressed the need for her to return to see the psychiatrist. As a result, an extremely belligerent woman, with a highly incensed husband appeared at the Dean's office, demanded an audience and proceeded to read the riot act about the hospital in general, insisting that the doctors had all told her, "The trouble is all in my head." She refused to return for any purpose whatsoever.

E.B.: The circumstances surrounding an initial interview with a very intelligent but extremely sensitive and emotionally immature nurse resulted in her breaking four or five subsequent appointments necessitating a change in therapists. The girl was seen in the regular Friday morning clinic through an error, and as is customary in the clinic, a medical student and the social worker were present. Although the questioning was benign and casual, and

the therapist apologized for any mistake and explained that future interviews would be in private, the patient was so distressed by the whole situation that she felt that she could not face the therapist again. Since she was frequently seen socially among the medical students, she was particularly fearful that her presence in the office of a psychiatrist had been revealed to her acquaintances. She then built up a tremendous feeling of guilt regarding the first therapist and eventually agreed with great reluctance to keep an appointment with another therapist. Treatment has since proceeded satisfactorily.

E.G., a 41 year old white male, was referred from the Medical Clinic after examination had revealed no organic cause for his right wrist drop. A diagnosis of hysteria had been made at the time of referral. At the original psychiatric interview on a day during which the week's referrals are seen, only sufficient time is given each patient to make a diagnosis and/or determine treatability. This patient was seen for but fifteen minutes, as it appeared obvious that he was in need of treatment and the diagnosis of conversion hysteria seemed a reasonable possibility. During the interview routine questions were asked, as to the time and nature of the onset of his disability, and duration and character of any contributing or precipitating factors. No significant material was educed. In an attempt to reassure the patient, it was explained that no organic cause had been found, and it was suggested that possibly his trouble was emotional in origin. An appointment for the following week was made with the explanation that he would have a full hour. However, he failed to return, nor did a follow-up communication aid in bringing him back.

A retrospective attempt was made to ascertain in what way the therapist may have adversely affected the patient's apparently sincere desire to obtain help. Due to circumstances peculiar to this clinic, it is believed sufficient time was not allowed for the first interview, and the patient probably felt inadequately considered. In being given such a short hearing, with emphasis on absence of organic factors and rather glib assurance he could be helped, the patient may have felt that either he had not had careful consideration or that the examiner believed him to be malingering. In addition, it is believed that his receiving too strong assurances of his being able to obtain effective help may well have been assaultive to his unconscious need for his symptoms and thus have driven him away.

Summary

A preliminary discussion is presented of the problems faced by a psychiatrist in examining patients on the general hospital wards and in the out-patient department for the first time. A description of the initial psychiatric interview with its special problems follows. Examples of initial interviews held with patients on the wards and in the clinic are given and variously illustrate the following points:

1. Patients on a general hospital ward have certain emotional needs and present special problems to the psychiatrist examining them for the first time.
2. Hostilities and resentment are encountered concerning their hospitalization, or the previous management of their case, or being referred to a psychiatrist, and these must be anticipated and dealt with.
3. Enough time should always be given in the initial interview so that the patient does not feel rushed or neglected and that emotional reactions arising during the interview may be handled adequately.
4. The therapist must not be too aggressive or authoritative in his approach. He should not merely adhere to a rigid routine of history taking.
5. The inexperienced therapist should be careful not to give too early psychodynamic interpretations to the patient on first contact.
6. There is a need in psychotherapy, particularly in the first interview, for a non-critical, non-censoring attitude on the part of the therapist, with an acceptance of the patient as he is.
7. There is often a tendency for the therapist to rationalize his failure on the basis of the patient's inadequacy, rather than on the inherent difficulties of the problem or faulty interviewing techniques, inflexible routines and the therapist's own preconceived prejudices.
8. Careful handling of the first interview can often contribute to the proper evaluation of the patient and his future therapy.
9. If more were reported on the mistakes and errors made by the psychiatrist early in his training, it would be of great benefit in helping to improve interviewing techniques.

Progressive Muscular Dystrophy

Report of a Case in a Non-Identical Twin

LOUIS J. KARNOSH, M.D.
Cleveland, Ohio
and
SALVATORE R. LATONA, M.D.
Cleveland, Ohio

PRESENTATION

Progressive muscular dystrophy is a chronic, degenerative, primary myopathy characterized by a marked heredo-familial disposition. The instant case is of special interest regarding the heredo-familial phase of this disease.

A twelve-year-old white male child presented himself at the Cleveland Clinic with a chief complaint of an inability to perform usual physical activities. This child is one of non-identical twins. The twin sister has never presented any complaints referable to the muscular system. The rest of the family history is negative except that the paternal grandmother had an illness which required her to be kept outdoors. The patient was apparently well until the age of one when the parents noted a general retardation in his muscular ability. He did not walk until nineteen months; however, speech was noted at a normal age. He had three severe convulsions at two years. The muscles never seemed to attain full development and the atrophy first became apparent when he was four. Thereafter his movements became slower and he exhibited a general muscular disability. The statural development was progressive until the age of eleven. At this time he was forced to leave school being unable to keep up with his classmates. Meanwhile the twin sister had developed normally, both physically and mentally.

Physical examination of the patient at the age of twelve revealed a muscular atrophy of the proximal portions of both upper and lower extremities. There was a marked asthenia of the upper extremities. The dynamometer readings were: Right, 5 kilos; Left, 5 kilos. He could not erect his head without the aid of his arms. The deep reflexes of the upper extremities and the left lower patellar reflex were diminished. At thirteen the disability became more pronounced. When he was again examined at the age of fourteen a progression of the muscular atrophy was noted. He could not arise from the lying position by normal body and head flexion. Later in the same year, re-examination revealed terminal features of progressive muscular dystrophy. The asthenia and atrophy of the proximal muscles of the extremities had progressed, giving the patient a "Pop-eye the Sailor" appearance. The muscles of the face had smoothed out somewhat. At this time the patient could not even rise to a sitting position.

We emphasize that the twin sister has developed normally, both physically and mentally. She was seen in September, 1946 at the age of fourteen at which time the neurological examination was found to be entirely negative.

The significant laboratory findings as compared with those of his normal twin sister are:

	Patient	*Normal Twin*	*Normal*
Urine Creatine	658 mg.	40 mg.	10-50 mg.
Urine Creatinine	553 mg.	1220 mg.	1250 mg.
Blood Creatine	3.1 mg./100 cc.	2.2 mg./100 cc.	3-7 mg./100 cc.
Blood Creatinine	2.3 mg./100 cc.	2.6 mg./100 cc.	.5-2.5 mg./100 cc.

Patient and Twin Sister

HISTORICAL BACKGROUND

Meryon[1] in 1852 described a syndrome in three brothers, with possible early involvement in a fourth brother, which was most likely progressive muscular dystrophy of the pseudohyprotrophic form. Duchenne[2] in 1868 could not discover hereditary traits in his cases; however, quoted contemporaries who were impressed by the familial incidence of the disease. Erb[3] in 1891 wrote of his juvenile and hereditary form. Since then there has been a host of writers who have presented evidence for the heredofamilial influence present in progressive muscular dystrophy.

Various writers have reported different percentages of positive heredofamilial histories. Milhorat and Wolff[4] studied seventy-five families in which one hundred twenty-five members were affected with progressive muscular dystrophy. They examined eighty-five percent of these patients and found that twenty-five percent had a positive familial history of the disease. Shank, Gilder, *et al*,[5] reported that twenty-six cases in their series of forty gave no familial history. Hurwitz[6] had a positive familial incidence in forty-two percent of his series. Byard[7] presented four cases in which three showed no familial history. One must view the varying percentages with caution because, as expressed by Pearson,[8] the longer one studies the history of familial diseases, the more he is impressed by the difficulty in placing them within the scope of the genetic schemes. He believes the difficulty is really due to a failure of records rather than to the diligence of inquiry.

By far, the male sex is most usually involved in progressive muscular dystrophy. Duchenne[2] stated that of the twelve cases he had seen, ten had been males. Hoagland, Gilder, *et al.*[9] place the ratio at six males to one female. Seventy-five percent of the series presented by Hurwitz[6] were males. Milhorat and Wolff,[4] found the ratio to be three males to one female.

Barnes[10] believes that there is a large and imposing body of evidence to prove that progressive muscular dystrophy is determined at the birth of the ovum and is derived as a factor inherited from one or both of the gametes which form the zygote. Apparently the hereditary transmission of progressive muscular dystrophy may take place in three different ways: dominant, sex-linked, or recessive. Barnes and Milhorat and Wolff postulate that in those cases where the transmission is not definitely of either the dominant or sex-linked types, the preponderance of males in these groups would tend to point to a sex-linked recessive transmission. Many writers have emphasized the sex-linked nature in the majority of cases of progressive muscular dystrophy with a positive familial history. Both Hurwitz and Milhorat and Wolff report cases of progressive muscular dystrophy occurring in children of one mother but different fathers. Evans and Love[11] in reporting on what they termed familial progressive muscular dystrophy, state that the weight of opinion considers this disease as a sex-linked type.

It has been rather universally found that the different forms of progressive muscular dystrophy have a tendency to be transmit-

ted in various ways. The pseudohypertrophic form as noted especially in the series of Hough[12] and Polacheck[13] is chiefly transmitted as a sex-linked Mendelian trait. The scapulo-humeral form does not seem to follow any one type of transmission too closely. This form may very well fit into the type of transmission involving multiple recessive factors. Hough[12] and Bell[14] found that the facioscapulohumeral form is transmitted chiefly by dominant factors. Milhorat and Wolff[15] report a family in which twelve members developed the distal form of progressive muscular dystrophy and found that the transmission was of the dominant type.

Milhorat and Wolff[4] have written on the possible explanation for the occurrence of the cases without any apparent heredofamilial history. First, it is possible that the cases are sporadic. Secondly, the disease may have been inherited by either the recessive or dominant factor but was of the abortive form in parents or members of the rest of the family. Thirdly, it is possible that the heredity was by the sex-linked recessive factor but fortuitous escape by other male members of the family in the preceding generation may mask the factor of heredity. Lastly, the possibility exists that the transmission may possess multiple recessive factors requiring a certain number of these factors to be present before the disease becomes manifest.

DISCUSSION

This case emphasizes some of the factors which have been pointed out in the heredofamilial phase of progressive muscular dystrophy. At no time were the writers able to discover any neurological abnormalities in the twin sister. Her significant laboratory tests, of the blood and urine creatine and creatinine determinations, were entirely normal.

Fully realizing that non-identical twins evolve from separate zygotes, the writers believe that it is significant that in a case of non-identical twins, the male should be the one affected whereas the twin sister was entirely normal. One other case of twins was reported in the literature. Milhorat and Wolff[4] report a similar case occurring in twins in which the brother developed progressive muscular dystrophy and the sister showed no signs of muscular disease. These two cases would strongly help to confirm the observation that progressive muscular dystrophy is predominantly a sex-linked, heredofamilial disease. The case presented would also point to the fact that there is probably a recessive factor involved.

SUMMARY

1. A case of progressive muscular dystrophy in a male non-identical twin with an absolutely normal twin sister has been presented.

2. The fact that males are more frequently affected by this disease is emphasized.

3. Hereditary transmission of progressive muscular dystrophy apparently occurs in three ways: sex-linked, dominant and recessive.

4. Most evidence would point to the hypothesis that the greater number of progressive muscular dystrophies fall into a sex-linked, recessive category.

REFERENCES

1. Meryon, E.: On Granular and Fatty Degeneration. *Medico-Chirurgical Trans.* 35: 73, 1852.
2. Duchenne, G.: "De La Paralysie Musculaire Pseudo-hypertrophique ou Paralysie Myo-Sclerosique." Paris: P. Asselin, 1868.
3. Erb, W.: Dystrophia Muscularis Progressiva; Klinische und Pathologisch-Anatomische (Studien). *Deutsche Zeitschrift Für Nerven-Heilkunde* 1: 173 (Band I), 1891.
4. Milhorat, A. T. and Wolff, H. G.: Studies in Diseases of Muscles; Heredity of Progressive Muscular Dystrophy; Relationship Between Age of Onset of Symptoms and Clinical Course. *Arch. Neurol. & Phychiat.* 49: 641: 654 (May) 1943.
5. Shank, R. E., Gilder, H., and Hoagland, C. L.: Studies on Disease of Muscle in Progressive Muscular Dystrophy; A Clinical Review of 40 Cases. *Arch. Neurol. & Phychiat.* 52: 431-442 (Dec.) 1944.
6. Hurwitz, S.: Primary Myopathies; Report of 36 Cases and Review of the Literature. *Arch. Neurol. & Psychiat.* 36: 1294-1316 (Dec.) 1936.
7. Byard, D. S.: Four Cases of Muscular Dystrophy. *Internat. Clinics* 1: 174-177, 1923.
8. Pearson, K.: Two New Pedigrees of Muscular Dystrophy. *Ann. Eugenics* 5: 179-191 (Jan.) 1933.

9. Hoagland, C. L., Gilder, H., and Shank, R. E.: The Synthesis, Storage, and Excretion of Creatine, Creatinine, and Glycocyamine in Progressive Muscular Dystrophy and the Effects of Certain Hormones on These Processes. *J. Exper. Med.* 81: 423-438 (May) 1945.
10. Barnes, S.: A Myopathic Family, With Hypertrophic, Pseudohypertrophic, Atrophic, and Terminal (Distal in Upper Extremities) Stages. *Brain* 55: 1-46 (March) 1932.
11. Evans, W. A., and Love, C. H.: Familial Progressive Muscular Dystrophy in 3 Generations Living in the Same Neighborhood. *Mississippi Doctor* 23: 369-372 (July) 1945.
12. Hough, G.: The Hereditary Aspect of Progressive Pseudohypertrophic Muscular Dystrophy. *New England J. Med.* 214: 1189-1191 (June) 1936.
13. Polacheck, W. S.: Heredity of Pseudohypertrophic Muscular Dystrophy. *Am. J. Dis. Child.* 61: 1251-1253 (June) 1941.
14. Bell, J.: On the Age of Onset and Age of Death in Hereditary Muscular Dystrophy With Some Observations Bearing on the Question of Antedating. *Ann. Eugenics* 11: 272-289 (May) 1942.
15. Milhorat, A. T., and Wolff, H. G.: Studies in Diseases of Muscle; Progressive Muscular Dystrophy of Atrophic Distal Type; Report on Family; Report on Autopsy. *Arch. Neurol. & Psychiat.* 49: 655-664 (May) 1943.

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Psychosomatic Conference

of the

Cincinnati General Hospital*

MILTON ROSENBAUM, M.D., *Editor*
FREDERIC T. KAPP, M.D., *Associate Editor*

CASE NO. 141

ULCERATIVE COLITIS

PRESENTATION

Doctor Kapp:

The patient, a 38-year-old white woman with non-specific ulcerative colitis, was admitted to the hospital in August, 1945. At that time she complained of eight to twelve watery bowel movements daily during the preceding month. She had noticed flecks of blood and shreds of slimy mucus in the feces. In addition, the patient complained of crampy abdominal pain, nausea, fever, and a sixteen-pound loss of weight. She gave a history of several similar attacks previously which had been treated by her family physician at home.

On admission the pertinent physical findings were evidence of considerable weight loss, temperature of 103° and a colon which was palpable and tender throughout its course. Pertinent laboratory findings showed a mild secondary anemia, a negative blood culture, specks of blood in the stools, repeatedly negative stool cultures for typhoid and dysentery, no amebae or ova, and negative Frei and tuberculin tests. Sigmoidoscopy revealed several discrete ulcers and a mucosa that was hyperemic and granular. Smears for amebae from the ulcers were negative. Upper gastroenteric x-rays showed nothing unusual. Barium enema revealed marked spasm of the descending colon. There was irregularity of the bowel pattern and the lateral edges were fuzzy. The remaining portions of the colon were not unusual.

Her course during the next six weeks was characterized by intermittent fever, bloody diarrhea and continued weight loss. In addition to the usual supportive therapy, the patient received at various times, blood plasma transfusions, emetine hydrochloride, carbarsone, sulfasuxadine, and penicillin. None of these measures seemed to affect her appreciably, but the symptoms gradually subsided. Convalescence was complicated by an anal fistula which was treated surgically. The patient was discharged after four months to the care of the clinic.

During her stay on the ward the medical resident noted some correlation between her diarrhea and certain environmental factors

*From the Department of Psychiatry, College of Medicine, University of Cincinnati.

and for that reason he requested a psychiatric consultation. The patient was found to be a plain-faced woman with a permanent frown, who was emotionally shallow and whose interests and outlook were extremely narrow. She lived with her widowed stepmother who was her only close companion. They shared a room and until recently, shared the same bed, Her only amusements were accompanying her stepmother to church and to the movies. Patient never drank or smoked, and her goal in life was to continue living at home with her stepmother.

She was born and raised in Cincinnati, the youngest of four children. Her father was a strict, taciturn man who ran a grocery store. Her mother died of tuberculosis when the patient was four years old. She had no recollection of her mother. Her father remarried a year after the mother's death, and two half-siblings were subsequently born. The patient's stepmother told the examiner that when she married the patient's father, the children were thin and undernourished, and she had a hard time getting them on their feet again. She recalled that the patient's real mother had been drunk frequently. She said that the patient was a frail child and never had her birthright. She had been a shy, well behaved, little girl, and the stepmother characterized her as the "neatest child that ever was." The patient felt closer to her stepmother than to her father or her own siblings, and she looked back on a happy childhood, with her stepmother as someone on whom she could always lean.

The patient's earliest memory was an unusual one. Her first recollection was of swallowing a marble and then being given a laxative in order to get rid of it. She attended parochial school and adjusted well to the nuns and the other girls but had nothing to do with the boys. The patient quit high school in the second year and went to work in her father's shop. During her adolescence she went out occasionally with girl friends but spent most of her spare time at home. Later, she held a succession of simple factory jobs but never had a position of responsibility.

For some years she had chronic constipation, and became accustomed to taking two laxatives weekly. Her bowels were always very sensitive to emotional upsets. For example, if a fellow worker was injured, the patient immediately had a watery bowel movement.

When the patient was twenty-eight years old, her father suffered a stroke and died a year later. Her diarrhea started on the night of the funeral. During the period of intense grief, which dragged on for several months, the diarrhea persisted. X-rays were taken by a private physician and showed spasm of the colon; he diagnosed colitis.

After her father's death she continued to live with her stepmother and siblings. However, in 1942 the last sibling married and left the patient alone with the stepmother. The latter has been a semi-invalid for years because of severe varicose veins. The patient was quite content living with her stepmother, whom she described as a "chronic worrier." When asked if she ever thought of getting married, the patient replied, "I was never interested, and furthermore, somebody had to be close to mom, and none of the others were."

Her second episode of prolonged diarrhea occurred in September 1944 under the following circumstances. As the patient and her stepmother were crossing the street, an automobile suddenly came around the corner, sideswiped the stepmother and dragged her along the street. She suffered bruises but refused to go to the hospital. However, the next day a relative persuaded the stepmother to come to her home for nursing care since the patient was unable to leave her job and care for her stepmother. On the following day the patient developed diarrhea. Nevertheless, she continued to work at the factory and also had to prepare the meals at home for herself and a woman boarder. Her diarrhea persisted for three weeks and ended abruptly after her stepmother recovered and returned home.

The patient's third episode of diarrhea, which led to the initial hospital admission, occurred in the summer of 1945. That spring the stepmother's aunt came to their home for a visit. The old lady liked it so well that

she settled down and showed no inclination to leave. The patient characterized her as finicky and set in her ways. She was furious at the aunt for not paying board and not helping with the housework, but hid her resentment. It was in this setting that her third episode of prolonged diarrhea started. She remained in the hospital four months. Recovery eventually ensued after a stormy course. While she was on the ward, the hospital social service department arranged to have the aunt leave the patient's home.

During the spring of 1946 the patient felt well and was able to work, but in August 1946 the ulcerative colitis recurred. She tended to blame her diet or difficulty with her fellow workers. However, she casually mentioned to the interviewer during a psychosomatic conference that she no longer slept in the same bed with her stepmother. This separation in their sleeping arrangements occurred shortly before the recurrence of the diarrhea. At that time a cousin had stored some furniture with them, including a bed, and the stemother decided that now that they had two beds they might as well make use of them. Within several days, the patient's diarrhea started, and she was readmitted to the hospital.

Again she ran a stormy course with bloody diarrhea, fever, secondary anemia, and loss of weight. Bacteriologic and parasitic studies were repeatedly negative. Barium enema showed an extension of the process from the descending colon into the transverse colon. Sulfa drugs, penicillin, and emetine had little effect, but after three months her symptoms slowly abated. While the patient was convalescing it was decided to perform a colectomy because each attack had become increasingly severe and the pathologic process was extending into previously uninvolved portions of the bowel. A preliminary ileostomy was done in December 1946. Following it there was a moderate flare-up of symptoms and the development of a fistula which has since almost closed. Post-operatively the patient received special attention, being in the first bed on the ward and on a Bradford frame. She enjoyed being the Number One patient on the ward, and as one observer noted, resembled "Cleopatra on her barge." The patient frequently stated that she did not intend to leave the hospital until she was perfectly well. Her stepmother who visited the patient often, was having difficulty supporting herself on an old age pension without the patient's wages. She worried about how the two of them would get along when the patient returned home. However, the patient told her not to worry that the hospital would arrange for her care in some way or other.

Recently, the surgical resident told the patient that she could go home and be treated in the clinic during the next few months until she was prepared for the colectomy. His statement precipitated a spike of fever as well as watery bowel movements and "gas pains." Therefore, she has remained in the hospital.

In summary, the patient is a 38 year old single, white woman who has led a restricted life with her stepmother as her only close companion. She had four episodes of ulcerative colitis; the first, during a period of mourning for her father; the second, following an injury to and subsequent separation from her stepmother; the third, during a period in which she resented an old lady's intruding into the household and upsetting the mother-daughter relationship; and the fourth, after she could no longer sleep in the same bed with her stepmother.

INTERVIEW WITH PATIENT—

Dr. Milton Rosenbaum:

The complete interview is not given as it repeats material presented in the history. It emphasized the patient's immaturity and the poverty of her relationships with anyone except her stepmother. It brought out the precipitating events associated with her previous attacks of colitis and the tendency to develop diarrhea following even slight emotional strain. That portion of the interview which follows centers around the flare-up in symptomatology she was experiencing at the time.

Doctor Rosenbaum: What are your plans now?

Patient: Go home to rest; then, come back for my other operation.

Doctor Rosenbaum: You're not going back to work?

Patient: No.

Doctor Rosenbaum: Who's going to take care of you?

Patient: Mother.

Doctor Rosenbaum: I thought she was sick.

Patient: Well, she isn't that sick. We're going to have a hard time managing on her pension.

Doctor Rosenbaum: You're worried about it?

Patient: No, why should I be? I haven't left the hospital yet.

Doctor Rosenbaum: Do you have any symptoms now?

Patient: My bowels are real loose now.

Doctor Rosenbaum: For how long?

Patient: About a week.

Doctor Rosenbaum: When did they move you to the convalescent ward?

Patient: About a week ago.

Doctor Rosenbaum: When did Doctor ———— leave your ward?

Patient: A week ago. He told me before I was moved that I had grown to be like one of the family, but my new doctor wanted me to take care of myself at home.

Doctor Rosenbaum: How did you feel about that?

Patient: I didn't like it.

DISCUSSION:

Doctor Rosenbaum: The importance of emotional factors in patients with non-specific ulcerative colitis is illustrated in this case. What was the precipitating factor in her last attack?

Student: They acquired an extra bed in the home and she could no longer sleep with her stepmother.

Doctor Rosenbaum: Why didn't she mention that when the initial history was obtained?

Student: Sleeping with her stepmother was a rather childish thing and she did not want to mention it because it showed she was so dependent upon her stepmother.

Dr. Rosenbaum: As infantile as this woman is, it is still a blow to her pride to admit that. We knew from our previous contacts with her that separation and loss of attention from her stepmother or father precipitated other attacks, and we were looking for a similar precipitating factor. When her mother had the accident, what do you think her emotional feeling was?

Student: She probably began to reflect about what actually could have happened to her stepmother—that she might have been killed. However, she didn't lose her stepmother through the accident but through the treatment.

Dr. Rosenbaum: What else happened at that time?

Student: She had to cook for the girl boarding with them.

Dr. Rosenbaum: Yes, she had not only lost the support of the mother but she had to assume the role of a mother. What do you think is responsible for the flare up she has now?

Student: The loss of Doctor ————.

Dr. Rosenbaum: Yes, she evidently formed a very strong attachment for him and to the first floor where they treated her so well, taking care of her every need. Now, she has been sent to the third floor where she is not well known, and where she may get less attention. Also it was the new doctor who suggested that she go home. Were any medical or surgical factors thought to be responsible for the present exacerbation?

Dr. Kapp: No explanation to account for it was given in the record.

Dr. Rosenbaum: Why do you think she takes these things so hard?

Student: She is like a child, very demanding. At some points during the interview I felt that if she had a hammer she would have struck someone.

Dr. Rosenbaum: In what other ways can a child show hostility?

Student: In urinating and defecating.

Dr. Rosenbaum: Can you give me an example?

Student: Arrival of a new sibling in a home.

Doctor Rosenbaum: It is well known that if something happens to upset a child who is toilet trained, i.e., the arrival of a new baby, the child may regress to his pre-toilet training level to regain the attention he has lost. How does the child feel toward the mother?

Student: There is some hostility.

Dr. Rosenbaum: Yes, and this may be a way to express hostility. Are there any other emotional feelings connected with functions of the lower G. E. tract?

Student: Children gain pleasure from it.

Dr. Rosenbaum: You mean the fact that they can do as they please; they do not have to inhibit. Giving up the stool may also be a way of gaining love for they are pleasing mother when they do it. You say that the infant may gain pleasure in not holding back. There is also pleasure in being able to master a task—whether it's control of the anal sphincter or mastering a sport. How has this patient utilized this?

Student: She's showing hostility.

Dr. Rosenbaum: Then, you think there is a lot more hostility toward the stepmother than she admits?

Student: Well, yes.

Dr. Rosenbaum: What happens if a person is caught in a situation where he cannot express hostility because his dependent needs are so strong?

Student: It is common to utilize a physical function to express an emotional feeling, but a mature adult turns toward some other activity or becomes openly angry.

Dr. Rosenbaum: Why do you think reactions are so intense in this case? Why is she so sensitive to separations?

Student: Because she has been dependent on her stepmother since the age of four.

Dr. Rosenbaum: When does the relationship with the mother start?

Student: At birth.

Dr. Rosenbaum: Was she ever separated from her real mother?

Student: Yes, when her real mother died.

Dr. Rosenbaum: What do we know about her real mother?

Student: She was a drunkard.

Doctor Rosenbaum: When the stepmother came into the home, in what condition was the patient?

Student: Undernourished, sickly.

Dr. Rosenbaum: How do you think her real mother treated her?

Student: She was probably neglected.

Dr. Rosenbaum: From the history we gather that the mother had tuberculosis and evidently had been sick for some time. In addition, she was an alcoholic. Do you think this girl had a good start in life?

Student; No.

Dr. Rosenbaum: We come down to the original trauma or frustration. What are the two usual things we look for when we find that somebody is overly attached to another person?

Student: The person has been neglected.

Dr. Rosenbaum: What does that lead to?

Student: Pain.

Dr. Rosenbaum: Anger, too, and the need for security. Another situation leading to over-dependence is spoiling. How do you explain her recent fever?

Student: The fever in any emotional state mounts.

Dr. Rosenbaum: How?

Student: It affects the hypothalamus.

Dr. Rosenbaum: I doubt that. Three or four days ago she was moved from one ward to another. Do you think that had something to do with this?

Student: Yes.

Dr. Rosenbaum: Probably the emotional trauma of being separated from her doctor and familiar ward, stirred up activity in the lower intestinal tract, resulting in a flare-up of the inflammation in the colon. Emotional states can produce dysfynction of the gastroenteric tract through the mediation of the autonomic nervous system. That such a physiologic disorder can bring about actual tissue changes is not as generally accepted. The work of Wolf and Wolff demonstrating hyperemia, hypermotility, and hyperacidity of the stomach associated with emotions, and their experimental production of a peptic ulcer in a man with a gastric fistula indicates that gastric dysfunction associated with emotion can produce structural pathology. The lower G. E. tract is certainly not immune to similar physiologic changes accompanying emotional states. In the presence of an existing infection such changes could well produce a flare-up. Several observers have noted that emotional factors cause exacerbations of even more specific types of infectious colitis such as that due to amebae. In these instances the organism which has been latent in the colon becomes pathogenic when either physical or emotional factors produce changes in the colon which make it more vulnerable to the action of these organisms.

Dr. Ferris: The last time she was in the hospital with ulcerative colitis, she had a hectic temperature chart. There was fear that this patient would not survive the disease. She certainly still has ulcers or inflammation now.

Dr. Rosenbaum: It will be interesting to see how she will react to another emotional trauma after the colon is removed. Her immature personality will remain a problem. One infantile aspect of it is that she is not at all worried about her future—she is sure someone will help her. This is certainly a case where a social service worker is indicated.

Dr. Ferris: Don't you think her dependence on the hospital might give us a clue to her future handling. After the operation has been done and when the mother may have passed on, she could be given a position in the hospital as a maid or attendant.

Dr. Rosenbaum: The problem of ulcerative colitis is certainly not yet fully solved, but a variety of leads have accumulated to indicate the probable high importance of emotional factors in the precipitation, perpetuation, and aggravation of this syndrome. This case demonstrates the important role of emotional factors in precipitating attacks of ulcerative colitis. The specific emotional conflict centered around situations in which the patient was separated from someone to whom she was closely attached and on whom she was dependent. Her personality make-up was extremely immature and childlike. Her whole life centered exclusively about one person, the mother figure. Her history is particularly devoid of anything to suggest emotional growth and maturity such as emancipation from parental figures, strivings toward independence and self-sufficiency and yearnings for marriage and motherhood. Similar personality patterns were noted by Dr. Erich Lindemann in his group of patients with ulcerative colitis. His patients had a marked poverty in human relationships, and their lives usually revolved around one key person. Whenever that relationship was threatened—whether by physical separation or disappointment—attacks of colitis developed.

But why is this patient so sensitive to separation and why does the emotional up-

heaval of these occasions affect her lower G. E. tract? The material at hand satisfactorily answers the first question but not the second. The persisent immaturity in adult life results from the irreversible scars originating in the severe psychological traumas and deprivations of early childhood. Because of the obvious neglect which she experienced from her real mother due to the latter's alcoholism and chronic illness, she had little security as a young child. This early rejection led to an intense longing for security which she apparently satisfied in her childlike relationship with her stepmother. For this reason she became hypersensitive and reacted as a small child to situations in which she was forced to face separation from a mother figure. The important point is that the emotional feelings and tensions created in such situations are not expressed overtly in speech or behavior but are expressed through dysfunction of the lower G. E. tract.

In this patient we have no concrete data why the lower gastroenteric tract was used to express her emotional conflict, but it may be of more than passing interest that the patient had always reacted to emotional tension by bowel upsets, and that her earliest memory had to do with bowel functions. Also her extreme neatness and cleanliness are common character traits seen in persons prone to lower gastroenteric tract disturbances. Even if the psychodynamics were more specific, it would not be our opinion that such psychogenic factors represented the sole etiology of this patient's illness. There is little doubt that she suffers from severe inflammation of the colon; however, we believe that the emotional upheaval resulting from environmental stresses led to functional physiologic changes in the lower gastroenteric tract in the nature of increased motility and vascular spasm. These dysfunctions in turn may have produced areas of anemia with resulting necrosis of the colonic mucosa so that the customary bacterial flora became pathogenic. The most striking example of the role of emotional factors in this patient's illness was the exacerbation of her colitis in the controlled atmosphere of the hospital. She developed diarrhea, pain, and fever when she again suffered the trauma of separation, which in this instance consisted of losing the doctor whom she trusted and the hospital ward where she felt secure.

Ulcerative colitis is a serious disease with a high mortality rate. Undoubtedly, numerous factors play a role in the final production of the illness. We believe a serious error has been made in trying to evaluate one or another factors in etiology or one or another method of treatment by attempting to isolate them. Actually, most of these patients are exremely ill. We must remember that they show evidences of infection, that they may perforate and develop peritonitis, that they frequently bleed and have severe anemia, that they develop nutritional deficiencies and that it is necessary to direct therapy toward each of these difficulties regardless of the emotional factors involved. Ileostomy may be a life-saving procedure and should always be kept in mind. The treatment of this disease requires close cooperation between internist, psychiatrist and surgeon.

Eastern Association of Electroencephalographers

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REVIEW OF PRINCIPLES OF ELECTROMYOGRAPHY

DR. DENNY-BROWN

(ABSTRACT OF ADDRESS)

The complex nature of the electrical field from which the motor unit potential is derived, and the wide extent of the connective tissue shunt in muscle were emphasized. Whereas the electromyogram of small superficial motor units in normal muscle could be localized to within 1 cm. the more powerful discharges of larger units, particularly in atrophic muscle, have a very much larger electrical field. Deductions from the behavior of multiple leads under these circumstances requires rigid control of the associated mechanical contraction.

The electrical records of purely muscular diseases are characteristic only in terms of the recording system used, for the units are smaller than normal. An absolute criterion of the myasthenic type of failure, in distinction to fatigue, is difficult to obtain.

In "lower motor neurone" disease fibrillation and fasciculation are valuable diagnostic criteria. There are many kinds of heightened neuronal excitability which are characterized by spontaneous "fasciculation" and it is worthwhile attempting to differentiate central fasciculation from other types. Undoubtedly several types occur in the amyotrophic group of diseases.

The absolute synchronization of rhythm in different motor units claimed by some to be characteristic of central neuronal disease, by others of spasticity is criticized, and held to be due to multiple records of the same simple large unit. The participation of very large but normal units early in willed contraction ("contraction fasciculation") occurs when the available motor unit pool is restricted by either central or peripheral disease. The apparent spread of effect is only relative to the intensity of contraction as a whole. Similar spread occurs late in a normal contraction when large units are active.

Partial synchronization is common in spastic conditions and various tremors. It is thought to be due to the rhythmical dissipation of abnormally intense inhibition as in experimental reflexes. Transitions from rebound to rhythmical tremor are found in parkinsonism and other tremors, as in spinal reflexes, and indicate that conflicting processes are active.

Whereas spastic conditions, parkinsonism and other types of clonus have fairly characteristic electromyograms, the discharges associated with pain and other tonic spasms are indistinguishable from voluntary movement, and the electromyogram alone does not assist differentiation between reflex and other movement.

The relationship between voluntary movement and posture is discussed, and it is concluded that if distinction between the actions of muscle as a prime mover, synergist and fixator are made there in every transition between a direct willed discharge beginning in one set of neurones and a pure stretch reflex beginning in another set of neurones. Either type of discharge may, when intense, include the focal neurones of the other group. Heightened reflex excitability may transfer the low threshold for willed contraction to the stretch reflex group. The proportional use of various motor unit groups by the nervous system is relative. Postural reaction in general is served by the stretch reflex, though the mechanics of the knee and ankle are such as to require little muscular effort in simple standing. The elastic properties of muscle are related to size of muscle fiber and relative proportion of connective tissue, and have no relation to postural reactions except when they lead to fixed shortening of muscle (contracture).

DISCUSSION:

DR. HENRIK SEYFFARTH

In a large number of paretic and healthy muscles, we found for the single unit that even in isometric contractions where the rhythm of the oscillations is most regular, the size of the interval between the oscilla-

tions may vary by up to 33% and rarely by less than 7%. Considering this great variation in size of intervals (also found by Lindsley in 1935) it should be remarkable if two motor units should not only discharge with the same general rhythm but present also identical variation in intervals.

The following report is from investigations performed in 1941, together with B. Kaada, using cathode recording ray and two concentric needle electrodes. Several times in healthy muscles we found synchronism of "the spike pattern" we call a motor unit, especially if the distance between the two electrodes was not more than 2 cm., but once the distance was 5 cm. Often we found synchronism when leading off simultaneously from two different heads of the triceps muscle. It could also be mentioned that in one patient with multiple sclerosis, we once recorded synchronism between two "spike patterns" originating in the biceps and triceps muscles during spontaneous activity. We felt that this synchronism was not an artifact owing to the fact that other units appearing in the two records at the same time were not synchronous.

After hearing the paper by Dr. Denny-Brown, I believe that the two needle electrodes have picked up the same motor unit. This point of view is supported by the fact that the synchronous spike pattern always appeared and disapeared at the same time and never occurred alone from one lead.

I always felt that there was no proof that synchronism is a pathological phenomenon because there is not sufficiently accurate information as to the electrical behavior of normal muscles.

For the problem of synchronism, it also may be useful to study the oscillations recorded by one single concentric needle electrode.

In records of a thousand different units in healthy and paretic muscles, we found that in 55% they had one or occasionally two small thickenings or "pearls" on the spike potential. When photographed at high speed, these "pearls" were found to be a secondary small spike. These "pearl units," also found by Burchtal and Klemmesen, are explained by the supposition that the different parts of the motor unit do not contract at the same moment.

This explanation may possibly also account for the appearance of "spike patterns" which on closer investigation show polyphasic discharges. Here it may be assumed that the needle picks up discharge from three or more different parts of a motor unit even in normal muscle. A few records from paretic muscle seem to show a similar phenomenon where the one part of a spike complex falls out at intervals. It is however difficult to use the same explanation where two sets of spike pattern follow each other all the time at a distance of about 7 milliseconds (but the distance between the two oscillations is not quite constant). The two spike patterns may have a different form and amplitude. This "parasite," as Dr. Denny-Brown called it, may be explained as a double discharge from one singe unit, but then we may assume that the distance between the two parts of the unit would be as much as 24 cm. (calculated by the rate for conduction of the nervous impulse). If the parasite represented a double discharge, we also should expect a greater regularity in the form of the oscillation, as in repetitive discharge. I have a record from a poliomyelitic patient, where the same spike pattern has sometimes only one single spike, sometimes two, but discharged three times just before disappearing. In such instances where the two spike patterns are separated by an interval up to 7 milliseconds and are different in form, we cannot exclude the possibility that the spike pattern is from two different motor units. It is therefore possible that in some cases two motor units are closely connected to each other in their function.

DR. SCHWAB: Concerning synchronism and techniques in electromyography, as pointed out by the two speakers, there is still a tremendous amount to be investigated, particularly from the clinical point of view.

With an ink-writing oscillograph of the multiple channel type and the cathode ray as a guide, we can follow some spike discharges quite readily. One of the things

we are interested in is the duration of these spike potentials. If the spike potentials occur at a frequency of more than 70 per second, the ink-writer bunches them together so much that it is impossible to pick them out as separate discharges. However, if they are discreet and occur at a lesser frequency than this, it is possible to pick them up quite readily on the ink-writing tape, if the speed of the paper is 6 centimeters per second or more. On the ink-writer, it has been shown that a single spike potential of a duration of about 5 milliseconds shows up quite distinctly and clearly at the ordinary amplification. Actual loss of gain is about 50% in such a spike. When the spike is 20 milliseconds in duration or above, it shows up with full amplitude exactly the same way it would with the cathode ray oscillograph.

The fibrillations seen in denervated muscles supplied by a cut nerve have a very short duration, between 1 and 3 milliseconds as a rule, and these are too short to be seen by the ordinary ink-writer as the amplitude is so reduced, probably 10% of its full value, and it would, therefore, be missed in most cases or if seen, would show only as a faint mark on the ink tracing. However, if the gain is turned up and the patient is in a shielded room with proper shielding of the electrodes, the fibrillations of denervation may then be seen, even on the ink-writer. If one has the cathode ray oscillograph covering the same area as the ink-writing tracing, or a loud speaker which responds to the fast frequency of the denervation spike, one can then detect their presence and then increase the gain of the amplifier, so that they will appear in the ink-writer as well. The advantage of the ink-writer is that it gives us multi-channels, so that we can examine up to 6 points at once and run the record continually with a visual result, that is at once obtainable, whereas with the cathode ray or with the moving coil type of oscillograph, we have to wait for the development of film or bromide paper. Therefore, the combination of the steady running ink-writer and a cathode ray, possibly with 2 channels appearing on the screen, gives us probably the most satisfactory method for the examination of the spontaneous activity in diseased muscle.

The problem of electrodes in electromyography is also still in a controversial stage. There are those who prefer the co-axial needle, devised by Adrain and Bronk, where the sheath of the needle serves as a ground and insulated wire at its tip the other electrode. The other type of needle electrode is the one described by Dr. Jasper, where the needle is insulated up to its tip, contains no co-axial element, and the other electrode is on the surface of the skin in the neighborhood of the needle. The third type is the surface electrode, usually similar to the electrode used in electroencephalography. Two metal discs which form the electrode elements are fastened on the skin with electrode paste and adhesive tape about 2 centimeters apart.

With surface electrode recording, using the ink-writer to register the potentials, it has been observed by a number of workers that in diseased muscles, such as in poliomyelitis, there is a synchrony in two parts of the muscle at the same time, and even in flexors and extensors in the same limb. The idea that this might be due to a spread of the electrical discharge, by simple conduction through the shunt of the tissue to the other electrode can be tested by the following experiment.

Two needle electrodes, 1 centimeter apart, are inserted into the quadriceps muscle near (5 centimeters) the patella. A pair of surface electrodes is placed between the patella and the two needle electrodes, another pair at the other end of the quadriceps and a third pair over the hamstring directly beneath the needle electrodes. A coaxial needle is also inserted into the quadriceps, 5 centimeters cephalad from the first needle electrodes; another coaxial needle is placed in the hamstring below the first eight needle electrodes. A single shock DC potential, having a voltage of 1/10 of a volt which is about 100 times higher than the voluntary muscle contraction potential, is discharged through the first pair of needle electrodes, while all of the other electrodes are hooked up to the recording channels of an ink-writing oscillograph. If the two pairs

of coaxial needles are connected so that their common ground is grounded through the channels, the stimulating current is picked up by both of the coaxial needles.

On the other hand, if the two coaxial needles are not grounded but are connected to the ink-writing oscillograph amplifiers through push-pull, the picked u pdischarge shows only in the needle electrode that is nearest to the stimulating electrode and does not appear in the muscle on the opposite side of the limb. The simulating current in the needle electrode is picked up by the surface electrodes near the stimulating needle, and not by the surface electrodes on the other side of the limb. This would indicate that when synchronization in the actual muscle potential is seen in diseased muscle on the flexors and extensors in the same limb, and when the recording electrodes are surface and fed into two different amplifiers on a push-pull circuit, that the phenomenon is not due to spread from one muscle through the limb to the electrodes on the opposite side. Furthermore, we have never seen this phenomenon of synchronization between the flexors and the extensors in a normal limb, nor have we found it in limbs where there has been a good deal of atrophy from disuse or in all cases of neuritis or poliomyelitis, even with considerable atrophy of the muscles concerned.

We have definitely ruled out the possibility of this being in any way explained by one amplifier affecting another in this same apparatus, as Dr. Mary Brazier has taken the trouble to show that it occurs in one apparatus and the synchronous discharge picked up in completely different set of amplifiers with its own ink-writer, in another room, the two being synchronized as to time. If the voltage in the stimulating discharge fed into the needle electrodes mentioned in the previous paragraph is increased to a neighborhood of 1/5 or 1/2 a volt, it will appear in all electrodes concerned and cause an obvious blocking of the amplifiers connected to electrodes. This, indeed, is due to the spread of the current throughout the entire limb.

Furthermore, it has been the common experience of workers in electromyography that an intense discharge from a muscle such as the quadriceps, from a large voluntary contraction, is not picked up by surface electrodes over the hamstrings opposite the muscle contracting. On the other hand, if one of the electrodes in each pair goes to a common ground, there will be a very definite pickup from the hamstring electrode pair. This would suggest that the phenomenon mentioned by Dr. Forbes could be explained by this means. Since Grey Walter showed that a good deal could be learned about the physiology of the brain, by using a synthesizer to simulate the action potentials of the cortex or brain waves, it might be feasible, in studying the physiology of muscle, to investigate the effect, particularly the spread of potentials from stimulating electrodes in the muscle. We feel that the whole matter of synchronous discharges in different muscle groups in the same limb is still not fully explained. It might be that there is some form of shorting, or intranuncial conduction that is pathological in the spinal cord or even within the nerve itself and was suggested by Granit in his paper in 1944. More work must be done before we can make dogmatic assertions about the origin and meaning of these phenomena.

UNIT ELECTROMYOGRAPHY IN NEUROMUSCULAR DISEASE

HERBERT JASPER

(ABSTRACT)

The electrical activity of motor units and single muscle fibres was recorded by means of a fine pointed steel needle electrode, insulated except at the point, with a reference electrode on the skin surface at the site of insertion of the needle through the skin. It was shown by comparison with concentric needle recording on a cathode ray oscilloscope, that a much less complex wave form, and more significant voltage measurements could be made with the unipolar needle electrode than with the concentric needle. Normal motor units appeared as triphasic waves, as would be expected from a conducted disturbance, the negative spike being of the greatest amplitude, reaching 2 to 6 millivolts.

They were about 5 to 8 milliseconds duration. In most muscles these waves are smooth, without significant notching, except in the muscles of the face where the synchronization of muscle fibres into smooth motor unit action potentials is much less perfect.

Denervated muscles, following degeneration of their motor nerve supply, showed only spontaneous fibrillation. Fibre potentials, as recorded by this method, appeared also as conducted triphasic disturbances of extremely brief duration and small voltage. There were only 1 to 2 milliseconds in duration and 10 to 200 microvolts in amplitude. They produced a sound like crackling of paper in the loudspeaker, as contrasted with the knocking sound of the normal motor unit potential.

Extremely complex and prolonged motor units of polyphasic form, amplitude between 200 and 800 microvolts, were observed in muscles undergoing re-inervation following regeneration of an injured peripheral nerve, and in muscles undergoing degenerative neuromuscular disease, such as in progressive muscular atrophy. This disintegration of motor units was always observed in fasciculating muscles and continued after novocaine block of the motor nerve in these muscles. Fasciculation was abolished by curare and increased with prostigmine. Disintegrated motor units were also seen in many cases of poliomyelitis when muscles were partially paralyzed. They do not appear in patients with cord lesions which do not involve the lower motor neurones.

This method of unit analysis of muscle function with unipolar recording by means of a cathode ray oscilloscope and loudspeaker is believed to reveal the form of muscle action potentiols in a manner certainly not possible with any type of ink-writing recorder and to yield information of value in the clinical diagnosis of various neuromuscular diseases.

DISCUSSION:

DR. D. DENNY-BROWN: I would like to draw attention to the extreme brevity of discharge in fibrillation, as evidenced by Dr. Jasper's beautiful records. If such brevity of potential is characteristic of excitation of a muscle fibre, its duration is extremely brief. Why is the discharge in a single motor unit so spread out? The muscle fibres of a single unit are closely packed in fasciculi but may overlap one another longitudinally. This longitudinal overlap may explain the secondary spike that Dr. Seyffarth calls a "pearl." Is the "pearl" a multiple spike? This question is of great interest in regenerating nerves to muscle, when secondary spikes are prominent. There is then probably great asymmetry of the muscle bundle of the motor unit. The "pearl" is different from the "parasite" which is separated from the spike by a time interval. I regard it as an artifact. The clearest way to avoid such artifact would be to analyze responses with surface electrodes. Dr. Jasper mentioned "purity of wave form" obtained by using the needle electrode. How do we know which is the more faithful record? We still need comparison of electrical recordings with various leads. With regard to spasm of muscles in poliomyelitis, I do not know how to differentiate a reflex response in painful muscle from a voluntary reaction to stretch. I doubt if injection of novocaine settles that particular problem for it removes the pain in either case.

DR. JASPER: We have taken monopolar and concentric needle electrode recordings from the same muscle. Concentric needle records may be very complicated electrically. Monopolar electrode gives a triphasic wave for conducted disturbance, as seen in slides. In some cases of polio, muscle spasm follows painful stretch, but in others there may be spasm without pain. I believe that both the reflex response to pain and stretch are involved in most cases.

THE ELECTROMYOGRAM IN BOTULISM

RICHARD L. MASLAND

(ABSTRACT)

Previous studies of the peripheral action of botulinus toxin have demonstrated that the muscle paralysis which occurs develops at a time when nerve conduction is still intact. These studies have suggested that the action of the toxin may be similar to that

of curare. The purpose of this study is to reinvestigate the peripheral action of botulinus toxin by means of the electromyogram, and, in addition, to evaluate the effectiveness of neostigmine and other drugs in treatment. Electromyography is an ideal technique for studying curarization, since the curarized muscle has a typical response characterized by a rapid falling off in the size of the action potential during continued stimulation of the nerve. If the peripheral action of botulinus toxin is identical with that of curare, the electromyogram should show this same form. Furthermore, any improvement in the condition effected by drug therapy should be readily apparent in an increase in the size of the action potential, and a change in the form of the response of tetanic stimulation.

Experiments were carried out on guinea pigs and cats. In one series of guinea pigs, doses of from 0.5 to 1.0 mld of botulinus toxin (type A and B) were administered intro-peritoneally. In these animals, general symptoms, including respiratory distress and muscle paralysis developed in from two to five days. In another series of guinea pigs and cats, smaller doses of the toxin were injected locally into the anterior tibial muscle of one leg. In these animals, a condition of local paralysis which might be compared to local tetanus was produced. The locally injected animals were preferable for study, since their general condition was unaffected, and in addition it was possible to compare the diseased muscle with its normal counterpart on the opposite side. The electromyogram was recorded from the anterior tibial muscle by means of a grounded electrode to which the isolated tendon was fastened, and a silver pin thrust into the body of the muscle. The leg was firmly clamped in a myograph frame. Stimulation was through the sciatic nerve.

When recorded by this technique, the electromyogram of the botulinus poisoned muscle showed characteristic features which distinguish it from that of the normal and also from that of the curarized muscle. It was characterized by a reduction in the size of the initial response (to as little as ten per cent of the response of the normal) with a progressive increase in the size of the potential during repeated stimulation. There was never observed any evidence of the rapid fall in potentiol which is characteristic of curarization. The form of the response showed considerable resemblance to that which has been reported in animals suffering from tetany due to dietary hypocalcemia.

The administration of neostigmine caused an insignificant increase in the size of the action potential, amounting in one instance to ten percent, but it did not alter the form of the response. Calcium, potassium, and guanidine were also ineffective.

These experiments indicate that the peripheral action of botulinus toxin differs from that of curare, and it is not antagonized by drugs which are antagonistic to this drug.

DISCUSSION:

DR. McEACHERN: I am sure that you will all agree that this is an excellent description of Botulism toxin action.

Botulism poisoning is rare, clinically. If we had to treat a case here at the Neurological Institute, we would want to have information such as this for constructive therapy. The picture is very similar to that of tetanus toxin. In tetanus toxin, there is a response, and also a more prolonged response with the injection of acetylcholine in the artery (30-60 seconds). In either instance has curare any effect? Prostigmine has none. From a clinician's point of view, these new techniques will be tried and abandoned, perhaps, in some diseases and conditions. But there are some other ways in which these techniques may be of great value: the quantitative evaluation in myasthenia gravis, of the disease and of its severity. Another field is the delineation of spasm, not only in polio, and working out regional distribution of spasm in the same way as referred pain, and advance in the states of fatigue. I am certain that some cases of fatigue must be mild and may be picked up only by these methods. This is very valuable as a guide in therapy, even as is curare in polio. By these methods, one could judge relaxation of spasm.

TECHNIQUES, NOMENCLATURE, AND ELECTROENCEPHALOGRAPHERS

HERBERT H. JASPER

(ABSTRACT)

A number of questions regarding the techniques and interpretation of electroencephalograms were raised in addition to discussion of the type and amount of training required for electroencephalographers.

It was pointed out that the type of electrodes now generally in use for electroencephalography are highly unsatisfactory, giving many artifacts which are constantly being mistaken for brain waves and causing technicians a great deal of unnecessary difficulty. Chlorided silver electrodes, or some such carefully made robust electrode which avoids bimetal potentials and direct metal to skin contact disturbances, are recommended.

It was recommended that the position of electrodes on the head be standardized in all laboratories so that uniformity of designation be achieved and further anatomical studies be carried out to make possible accurate charts of brain areas lying beneath the standard electrode positions.

It was strongly advised that we abandon the use of the term "monopolar," since there is a general agreement by many competent workers (not all) that there is no such things as a diffuse or "monopolar" lead in electroencephalography. The ear electrode should be called the ear electrode and recognized as an active lead to the inferior aspects of the temporal lobe and the base of the brain, being in many cases more "active" than scalp surface electrodes.

It was recommended that we abandon completely the use of clinical terms to describe wave forms in the E.E.G., especially "psychomotor," and "grand mal." Such terms only lead to confusion in scientific papers and discussions and serve to completely baffle and confound the clinicians who do not realize that we really do not mean what we say.

In regard to training of electroencephalographers and technicians, it was felt that it was much better that hospitals carry on without electroencephalography than that they obtain incompetent and inadequately trained personnel to operate an E.E.G. department just for the sake of having one. Assuming considerable natural ability, a technician cannot be adequately trained in less than one year of intensive work in a well qualified teaching laboratory. The same holds true for most medical men learning to be electroencephalographers. Comprehensive qualifying examinations are perhaps more important, but it is felt that few men can be considered competent to run an E.E.G. laboratory with less than one year of intensive training. To lower our standards to meet the immediate demand for more electroencephalographic laboratories is not fair to the patients who depend upon this technique for their accurate diagnosis and will serve to further discredit the technique of electroencephalography in the medical profession.

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Book Reviews

HYPNOTISM TODAY, by Jean Bordeaux and Leslie LeCron. (New York: Grune and Stratton, Inc., 1947.)

To anyone interested in hypnosis this book will be of interest. The authors are two psychologists who have been employing hypnosis as a psychotherapeutic procedure in the treatment of patients sent to them by medical men. A psychiatrist well known for his own experimental and therapeutic studies in hypnosis has written the foreword.

The purposes of the book, written for lay or professional public, are two-fold. The first part, 160 pages, constitutes a simple, direct, adequate survey of the available scientific knowledge on hypnosis. It is well organized, comprehensive, and the material reflects good critical judgment. It is free from the exaggerations, distortions and half truths that characterize many books on hypnosis, and is comprehensively informative.

The second part, 106 pages, deals with the principles, dynamics, methods and problems of hypnotherapy. The authors report upon their own clinical material and quote freely from the literature in discussing their findings. In a modest unassuming manner every effort is made to give the reader an adequate understanding of the character, development and treatment of each case.

The book commands attention and interest from cover to cover. It gives the reader a satisfied feeling that he has actually been introduced to scientific hypnosis. Now he can understand its induction, its phenomena and its applications. He is aware of the dynamics of behavior and the great number of human problems that need to be understood by the clinical psychologists, the psychiatrist and the medical man.

The book is highly recommended to the lay and professional public for whom it may well serve as an inspiration for further exploration in hypnosis.

Jean E. Stevenson, M.D.

Eloise, Michigan

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MENTAL DISORDERS IN LATER LIFE. Edited by Oscar J. Kaplan. Stanford University, Stanford University Press. London, Oxford University Press.

This book, the editor indicates in its preface, is not an exhaustive study of the mental disorder of later life, but is "rather a collection of essays selected to indicate the level of present achievement in this area." Seventeen chapters, written by different contributors, discuss a wide range of relevant subjects. These include the statistical, physiological, psychological, sociological, psychiatric, and psychotherapeutic aspects of the aging process.

This collection of contributions is a timely and scholarly addition to medical literature on the subject of mental disorders in the aging. It comes at a period when attention should be focused on the personality problems of the heretofore neglected aging person. It seems to seek the close collaboration of authors of many disciplines to design a pattern of future attack upon the mental disorders of later life. Its pertinence and importance outweigh its shortcomings.

The frequent repetition of similar data and similar observations by different contributors undoubtedly is inevitable. The tendency of some of the contributors to build hypotheses on speculations or on data of uncertain significance is perhaps permissible during the dawn of understanding of such processes. Certainly, for the physician who wants to learn more about recent advances in understanding of the senescent and senile patient, especially with respect to mental aberration, this book is a valuable source of information.

Louis A. Gottschalk, Ass't. Surg. (R)

U. S. Public Health Service.